

Magnetically Condensed Gaseous Filament Antennae for Extreme Control of Emissive Frequency

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Regardless of application, limitations exist on the range of possible frequencies which can be transmitted by antennae or, more practically, antenna arrays. In high-bandwidth applications, for example, data can be transmitted in an overlapping fashion using multiple antennae transmitting on nearly the same frequency, but the number of unique frequencies which may be used depends upon the number of antennae which can be fit on a chip. Once manufactured, the length of one of these antennae is, traditionally, fixed, and so, therefore, is its transmission frequency.

The ability to change an ordinarily static antenna's broadcast frequency with a fine degree of precision would open up new possibilities. This is particularly relevant in remote metrology applications in which antennae are larger and the number of antennae which can be fit into an array is, therefore, more limited.

In order to generate RADAR returns from objects which may produce null or weak returns, it may be helpful to try a number of closely collocated frequencies by fine-tuning the transmission frequency. This would ordinarily be difficult as a result of the static nature of the antennae used. RADAR-absorbing materials have a tendency to be changed in unique ways by repeated cycles of heating and cooling. Paints composed of suspensions of particles have a tendency to experience particle migration leading to coalescence of those particles into RADAR-reflective structures, necessitating that the aircraft be periodically repainted. The metallic nature of these particles makes it possible for them to act as RADAR reflectors, provided a precise enough frequency-match to the re-solidified clumps produced by partial integument liquefaction.

A bespoke magnetic field may be used to condense a filament of gaseous vapor in order to cause it to exceed a specific density threshold. Below that threshold, passing current through the vapor would not produce a transmission. Above the threshold, current passed through the gas would produce a signal. The length of the filament, although it is gaseous, would dictate the frequency of the emission. A sufficient level of granular control over the magnetic field would allow the boundary between the sub-threshold gas and the supra-threshold gas to be tuned by as little as a single atom and for the length of the antennae to be adjusted at a high rate.

One advantage of this system is that it would reduce the space requirement for antennae and would allow for a greater number of frequencies to be tried in a shorter span of time. This would put an end to the problem of there being gaps; however small; between the frequencies which can be used.

This type of antenna would also have as its advantage the ability to make adjustments to antenna length midway through the process of emitting a

single electromagnetic wave. This could be used to produce unique effects. For instance, if the antenna started as a short antenna and became longer over the course of the emission of a single wave and provided that current were introduced via photoelectric effects delivered via LASER to the central point of the antenna as it slides over a widening, V-shaped contact system, the result might be the production of a flat wave of electromagnetism with a property of amplitude but without a property of frequency. Such a wave would not be susceptible to absorption by metallic structures to the same extent as traditional electromagnetism.